Space Weather Forecast

Issued on Thursday 5 December 2024 at 12:07 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class X-ray flares likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with occasional low-level Moderate-class X-ray flares observed. Two near-simultaneous flares were seen from a pair of sunspot regions on the southeast of the Sun around 04/2100UTC, trumped late in the period by a slightly larger flare from a region on the southwestern solar horizon. Imagery to assess any CME from this is pending, although the emission region is around 90 West (i.e. not obviously intersecting the Sun-Earth line).

There are currently up to eight sunspot regions, with a ninth no longer discernible on the western solar horizon, and with two minor small unipolar regions near the middle of the Sun. The main trends observed in the period have included the migration of a southern peripheral spot westwards relative to its main spot in a group in the northwest, although this group appears magnetically unipolar in available imagery. Also of note were a proliferating and spreading tendency in a newly arriving region in the far southeast. Finally, the most complex group on the disc in the southeast retained its compressed appearance, with a large leader and a profusion of minor intermediate spots. These trends are all lower confidence than is typical given lower resolution of currently available satellite imagery.

The current disc is currently harbouring a large number of 'filaments' (arcs of plasma), including a very large series of filaments circumscribing the southeastern part of the Sun containing the most active sunspot regions. The bulk of these filament are remote from more obviously destabilising sunspot regions, however they will be increasingly relevant as they rotate westwards should they depart the Sun (being potentially more Earth-directed). Filaments in the northwest were more remote from the solar 'surface', although again there are no immediate signs of lifting off here.

A faint CME was seen on satellite imagery during the UTC evening of 04 December, however this could not be correlated with any obvious front-sided activity. No Coronal Mass Ejections (CMEs) are thought to have Earth-directed components at the time of writing.

Solar Wind / Geomagnetic Activity: Solar winds showed a gradual relaxation towards a slow regime in the period. Solar wind speeds fell to slightly elevated levels, while both the magnetic field and number of particles in the solar wind both remained level and within typical background.

The net result of the above solar wind measures was for provisionally quiet geomagnetic activity throughout the past 24 hours.

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Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate-class X-ray flares are considered likely throughout, with a level trend in risk.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs feature in the forecast. There are no coronal holes fast wind connections expected through the period, with slightly elevated winds easing to be mainly background. Geomagnetic activity is forecast to be mostly quiet.

Energetic Particles / Solar Radiation: No solar radiation storms are expected. There is a now slightly increased risk of Minor Solar Radiation Storm S1 in the tail end of the current UTC working week given the 05/1040UTC Moderate-class flare in a prone location. This risk should relax back to its previous residual into the UTC weekend.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	60	60	60	60
Very Active	R3-R5 (X Class)	No	5	5	5	5

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	10	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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